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SECRETARY OF THE AIR FORCE**

**AIR FORCE INSTRUCTION 11-2C-130  
VOLUME 3 ADDENDA D**



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***Flying Operations***

***LC-130 SKI PROCEDURES***

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This addendum implements Air Force Policy Directive (AFPD) 11-2, *Aircrew Operations*, and supports Air Force Instruction (AFI) 11-2C-130 Volume 3, *C-130 Operations Procedures*; AFI 11-200, *Aircrew Training, Standardization/Evaluation, and General Operations Structure*, and AFI 11-202 Volume 3, *General Flight Rules*. This addendum also implements requirements found in DODD 5101.16, *Executive Agent for Support to the National Science Foundation (NSF) Division of Polar Programs (PLR)*. It establishes policy for the LC-130 unit to safely and successfully accomplish the worldwide ski missions. This addendum applies to the Regular Air Force, Air Force Reserve and Air National Guard. Ensure that all records created as a result of processes prescribed in this publication are maintained in accordance with Air Force Manual (AFMAN) 33-363, *Management of Records*, and disposed of in accordance with Air Force Records Information Management System (AFRIMS) Records Disposition Schedule (RDS). The authorities to waive wing/unit level requirements in this publication are identified with a Tier ("T-0, T-1, T-2, T-3") number following the compliance statement. See AFI 33-360, *Publications and Forms Management*, for a description of the authorities associated with the Tier numbers. For deviations and waivers, follow guidance contained in paragraph 1.3. This publication requires the collection and or maintenance of information protected by Title 5 United States Code (USC) Section 552a, *The Privacy Act of 1974*. The authorities to collect or maintain the records prescribed in the publication are 37 USC § 301a, *Incentive Pay*; Public Law (PL) 92-204, *Appropriation Act for 1973*; PL 93-570 § 715, *Appropriation Act for 1974*; PL 93-294, *Aviation Career Incentive Act of 1974*; Executive Order 9397, *Numbering System for Federal Accounts Relating to Individual Persons*, as amended; Department of Defense (DoD) Directive 7730.57, *Aviation Career Incentive Act and Required Annual Report*; and AFI 11-401, *Aviation Management*. The applicable SORN, F011 AF XO A, *Aviation Resource Management System*

(ARMS), is available at: <http://dpcl.d.defense.gov/Privacy/SORNsSearchResults/tabid/7541/Category/277/Default.aspx>.

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## Chapter 1

### POLICY

**1.1. Sound Judgment.** These procedures provide guidance to plan and execute LC-130 ski operations in polar environments. Instructions in this AFI are intended to provide the best possible operating procedures across a wide range of circumstances, but cannot account for every possible situation a crewmember may encounter during a ski mission. Planners and aircrew must use sound judgment and operational risk management to manage unique mission demands.

**1.2. General.** The LC-130 is a highly flexible, all-weather, multi-mission weapon system, providing the capability to operate from a wide range of non-standard landing surfaces.

1.2.1. AFI 11-2C-130V3 Addendum D Annex A consists of LC-130 specialized briefings and checklists. This annex will be published and reviewed by NGB/A3M.

1.2.2. AFI 11-2C-130V3 Addendum D Annexes B & C detail LC-130 theater operations; Annex B (Antarctic Operations) and Annex C (Arctic Operations). Throughout this document these annexes are referred to as theater annexes. These annexes are published and reviewed as required by NGB/A3M.

1.2.3. AFI 11-2C-130V3 Addendum D Annex D details LC-130 Deep Field Mission Planning and Execution. This annex is published and reviewed by NGB/A3M

**1.3. Deviations and Waivers.** Do not deviate from policies in this AFI except when the situation demands immediate action to ensure safety. The Pilot in Command (PIC) is vested with ultimate mission authority and responsible for each course of action they choose to take.

1.3.1. Deviations. The PIC shall report deviations or exceptions taken without a waiver through command channels to their Chief, Major Command (MAJCOM) Stan/Eval.

1.3.2. Waivers. Unless otherwise directed, and in accordance with (IAW) AFI 11-202V3, waiver authority for the content of this instruction is MAJCOM/A3 with mission execution authority. For USTRANSCOM/AMC operational missions under Operational Control (OPCON) of 18 Air Force, 18 AF/CC is the waiver authority. For aircrews that Change Operational Control (CHOP) to a Combatant Command (CCMD) the Commander Air Force Forces (COMAFFOR) is the waiver authority.

## Chapter 2

### COMMAND AND CONTROL

**2.1. Command and Control (C2).** Refer to applicable theater annexes and applicable theater Operations Orders (OPORD's) for specific C2 requirements.

**2.2. Search and Rescue (SAR) Requirements.** Due to the increased risks associated with LC-130 operations, a SAR aircraft is required for operations to any site without manned ground support (**T-2**). Manned ground support will include weather reporting, food, shelter, first aid and communication capabilities.

2.2.1. Applicable C2 will determine if an in-theater aircraft other than a fully mission capable LC-130 is suitable. Consideration will be given to response time, carrying capacity and landing capabilities.

**2.3. Hostile Environment Kit Use.** Use of the hostile environment kit requires C2 authorization. If PIC is unable to communicate with the C2 agents, approval authority is delegated to the PIC.

**2.4. Crew Duty and Crew Rest Limitations.** Comply with AFI 11-202V3 and AFI 11-2C130V3 guidance. (**T-2**)

2.4.1. Flight Duty Period (FDP) for polar operations is 16 hours. (**T-3**) Open Snow, reconnaissance and polar airdrop operations are restricted to the first 12 hours of FDP. (**T-2**)

2.4.2. FDP waiver authority to recover from unplanned mission delays is delegated to the PIC during polar operations when communications with C2 cannot be established.

**2.5. Personal Requirements.** Refer to Attachment 2 and applicable theater annex.

## Chapter 3

### PRE-FLIGHT / GROUND OPERATIONS

#### 3.1. Polar Landing Zones (PLZ).

3.1.1. Ski Airfields. Ski airfields are groomed, skis only, landing zones, marked (flagged) as either Skiways or Ski Landing Areas (SLA) IAW AFI 13-217. Non-standard markings may be used with C2 concurrence.

3.1.2. Open Snow. Open snow areas are generally unprepared, skis only, open-field landing areas with limited or no markings. Open snow areas include snow fields, glaciers and floating ice sheets. Due to lack of surface preparation and airfield markings, open snow operations present unique risk elements that must be mitigated.

3.1.3. Ice Runways. Ice runways, prepared for wheeled operations, may be constructed on compacted snow, glacial ice or floating ice sheets. Ice runways should be marked in the same manner as ski airfields.

3.1.4. Mission Folders. 109 OSS/OSK will provide C2 and aircrews detailed mission execution folders for all Polar Landing Zones. Folders will identify Risk Management (RM) considerations, safe areas for landing, known or potential crevasse areas as well as other hazards. Mission Folders may be provided in hardcopy (paper) and/or a digital format (EFB). Reference AFI 11-2C-13 V3 Addendum D Annex D for additional information.

**3.2. Maximum Aircraft Gross Weight.** Maximum gross weights for aircraft operations at specific polar landing zones are established by C2 and will be disseminated by Notices to Airmen (NOTAM) or Read File (**T-3**). Following operations at a given site, the PIC should forward recommendations for increase or decrease in maximum aircraft gross weight to C2. Supervisors of Flying (SOFs) and PICs will ensure RM sheets reflect the increased risk of operations at higher gross weights (**T-3**). **NOTE:** Consideration to potential changes to landing zone conditions should be reviewed prior to each mission.

3.2.1. For operations at ski airfields, the initial maximum aircraft gross weight is 125,000 lbs. C2 may authorize a higher initial aircraft gross weight after evaluation of surface conditions.

3.2.1.1. Ski operations at aircraft gross weights above 135,000 lbs will only be approved after LC-130 ground evaluation of the prepared surface. Exceptions to this will be identified by pre-season analysis and annotated in theater annex (**T-3**).

3.2.2. Open snow ski operations are normally limited to a maximum aircraft gross weight of 118,000 lbs to 125,000 lbs based on surface conditions.

3.2.2.1. Ski operations up to aircraft maximum gross weight limits specified in TO 1C-130(L)H-1 will only be considered on a case by case basis after LC-130 ground evaluation, RM and C2 approval (**T-3**).

3.2.3. For ice runways, maximum aircraft gross weight will be 155,000 lbs (**T-1**). The maximum aircraft gross weight is dependent on numerous variables such as ice thickness, temperature, surface conditions and supporting substructure. Refer to AFI 13-217 Chapter 4,

applicable Engineering Technical Letters (ETL), and Ski Landing Area Control Officer (SLACO) documentation. Consider aircrew analysis of conditions when available.

**3.3. Cargo Loading and Offload Procedures.** Operations on skis in remote areas without material handling equipment (MHE) require the use of special on/offloading procedures and ski combat offload procedures. Permanent stations usually have a prepared cargo loading area and MHE allowing normal procedures to be used. The following restrictions apply to all polar cargo operations:

3.3.1. Normally, engines should remain running for all on/offloads at other than staging locations. However, the PIC may shut down engines at established sites when deemed necessary for mission accomplishment, provided the Auxiliary Power Unit (APU) is running before shutdown and remains running. Engine shutdown during extreme cold weather operations should be avoided.

3.3.2. During open snow operations, all cargo restraints (chains, straps) will be left in place until the aircraft has come to a stop at the offload area and clearance to offload has been received from the PIC; this is to prevent the possibility of a load breaking loose while taxiing **(T-3)**. **EXCEPTION:** Ski Combat Offload.

3.3.3. Ski Combat Offload. The ski combat offload procedure provides a means of offloading single, multiple, married pallets, and Container Delivery System (CDS) containers without the use of MHE when operating on skis.

3.3.3.1. Ski combat offloads are a core LC-130 tactic. At out camps, PICs are authorized to use ski combat offload procedures when deemed necessary for mission accomplishment. When carrying sensitive cargo, user concurrence must be obtained **(T-3)**. At permanent sites, PIC's will coordinate their intention to combat offload with the applicable C2. See TO 1C-130(L)H-1 for specific Ski Combat Offload procedures.

3.3.4. Transport of Ice Cores (Cold-Deck Operations). Extreme care should be taken to ensure samples are transported within shipper defined parameters to the maximum extent possible. The viability of samples can be destroyed even at temperatures below freezing. Refer to AFI 11-2C-130 V3 Addendum D theater annex for specific procedures.

3.3.4.1. Passengers will not be carried on flights with ice cores requiring cold deck procedures **(T-3)**. Exceptions to this policy require additional RM and C2 approval.

**3.4. Remote Fueling and Concurrent Servicing Operations.** Remote fueling is the transfer of fuel to or from an aircraft or ground storage system. Concurrent servicing is the simultaneous servicing of fuel with either passengers on board, the performance of minor maintenance, fleet servicing, or cargo on/offloading.

3.4.1. Engines are normally left running due to the remote environment and lack of support.

3.4.2. Remote fueling and concurrent servicing operations will be completed in accordance with AFI 11-2C-130V3, TO 00-25-172, refueling job guide and local procedures **(T-2)**. Refer to 109 AW/139 AS Remote Fueling Operations Training Guide for further guidance.

**3.5. Assisted Takeoff (ATO) Procedures.** C2 will determine the need for ATO based on environmental conditions and mission requirements. C2 will pre-coordinate ATO requirements with maintenance. The aircraft will be parked on a designated ATO loading area or "hot spot" at the staging base for ATO mounting **(T-3)**.

3.5.1. ATO bottles will be mounted on the aircraft prior to departure, unless waived by C2. Multiple sorties with ATO bottles mounted are permitted (T-3).

3.5.2. If ATO bottles and/or igniters are carried inside the aircraft, they will be manifested in accordance with AFMAN 24-204(I) (T-2).

3.5.2.1. The local fire department should be notified any time ATO will be mounted on the aircraft.

3.5.2.2. 109 AW will outline ATO operations and procedures in an appropriate Wing-level instruction or supplement to AFI 11-202V3.

**3.6. Extreme Cold Weather Procedures.** The LC-130 will not be operated in temperatures below its operational cold weather restriction (minus 50° C) (T-3). Aircrews will use the station's reported temperature; wind chill does not affect aircraft operating limitations. Waivers to operate at temperatures colder than -50°C (-58°F) will only be considered for emergencies such as medical evacuation. These missions require additional planning, risk assessment and C2 approval. **NOTE:** The temperature restriction is based on mission history, maintenance considerations, and performance limitations of AN-8 fuel and MIL-PRF-87257 hydraulic fluid (Ref: TO1C-130(L)H-1 and TO 42B2-1-3).

3.6.1. Material Handling Equipment (MHE). Aircrew will not normally on/offload cargo that requires MHE when surface contrails exist that obscure the visibility of the loading crew.

3.6.1.1. When temperatures are at or below -45° C, C2 will factor surface obscuration in mission planning prior to scheduling a mission requiring MHE (T-2). If a mission is released under these circumstances, the PIC and loadmasters will assess current conditions at the location to ensure necessary visibility for safe operations (T-1).

3.6.2. Before utilizing Low Speed Ground Idle or before warming the aircraft during extended stays/shutdowns at remote camps refer to the Flight Engineer FLIP, *Extreme Cold Weather Procedures/Techniques* section.

## Chapter 4

### FLIGHT OPERATIONS

#### 4.1. Taxi, Takeoff and Departure Restrictions.

4.1.1. General. Refer to AFI 11-2C-130V3 and theater annex for additional guidance.

4.1.2. Taxi Operations. Crews should be cognizant of the combined effects of gross weight (GW), wind, and runway condition reading (RCR) to both wheel and ski taxi operations. For wheeled operations TO 1C-130(L)H-1 states the LC-130 is capable of taxiing in a 30 kt, 90 degree wind with the use of nose-wheel steering and rudder. These numbers are based on favorable GW and RCR conditions. Lower GW's and RCR's are less favorable variables. Because the hazardous combination of wind, GW and RCR is difficult to judge, crews must thoroughly analyze current conditions to determine if it is safe to taxi the aircraft on wheels and/or skis.

4.1.2.1. Aircraft with gross weights of 135,000 lbs or greater will taxi on prepared (groomed) surfaces to the maximum extent possible. Comply with TO 1C-130(L)H-1 taxi restrictions (**T-2**).

4.1.3. Wind Restrictions. Ski takeoffs are prohibited when the surface wind (including gusts) exceeds 35 knots or the crosswind component exceeds 15 knots (**T-2**).

4.1.4. Ski takeoffs will be conducted by a ski mission qualified aircraft commander (AC) in the left seat or a ski mission qualified instructor pilot in either seat (**T-3**). *EXCEPTION*: See [Chapter 6](#).

4.1.5. Night ski takeoffs require 109 AW/CC approval.

4.1.6. ACs will not depart a staging base to a remote polar site without an operational #1 (pilot's) radar altimeter and APN-241 radar (**T-3**).

4.1.7. On departure, the navigator will call passing 50, 100, 200, 300 and 400 feet AGL, or as briefed by the Pilot Flying (PF).

4.1.8. Perform a detailed terrain study and review of engine out climb performance. If an approved Instrument Flight Rules (IFR) departure procedure is not available, ACs will ensure ability to climb in Visual Meteorological Conditions (VMC) until reaching the applicable Minimum IFR Altitude (MIA) (i.e. base of Restricted Operating Zone (ROZ), Instrument Meteorological Conditions (IMC) letdown corridor or enroute MIA) (**T-2**).

4.1.9. For departure weather minima and Visual Flight Rules (VFR)/IFR departure restrictions, reference [paragraph 5.1](#)

#### 4.2. Enroute Operations.

4.2.1. Utilize published airways or theater approved Area Navigation (RNAV) routing to the maximum extent possible.

4.2.2. To utilize unpublished routing, accomplish a thorough route study prior to departure to ensure safe terrain clearance.

4.2.2.1. When using unpublished IFR routing, calculate an enroute MIA that will provide 3,000 feet of terrain clearance within 22 nautical miles of center line (**T-3**).

4.2.3. Do not operate below 500 feet Above Ground Level (AGL) unless required for mission accomplishment.

4.2.4. All published courses and headings are polar grid, unless otherwise noted; Self Contained Navigation System (SCNS) convergence factor should be verified by another pilot/navigator.

4.2.5. Point of Safe Return (PSR). The PSR calculation determines the commit point beyond which return to the point of departure (or a suitable alternate) with the required overhead (or divert) fuel is no longer an option. Due to the austere nature of polar operations, aircrew will consider their alternate/divert options and determine a PSR when mission requirements dictate. At a minimum PSR will be computed whenever an Equal Time Point (ETP) is required. See **Figure 4.1** for PSR calculations. **NOTE:** Amend PSR when destination weather requires an alternate IAW AFI 11-202V3.

**Figure 4.1. - PSR FORMULAS.**

$$\text{PSR} = \frac{(\text{GS}_{(\text{Return})}) * \left(\frac{1}{2} \text{Time}\right)}{\text{TAS}}$$

$$\frac{1}{2} \text{Time} = \frac{\text{Takeoff Fuel} - \text{Overhead Fuel}_{(\text{Divert})}}{2 (\text{Average Fuel Flow})}$$

$$\text{Overhead Fuel}_{(\text{Divert})} = (\text{Reserve} + \text{Alternate} + \text{Approach} + \text{Landing Fuel})$$

**TAS** – Planned True Airspeed (Long Range Cruise, usually 270 KIAS)

**GS<sub>(Return)</sub>**– Planned Ground Speed return (usually TAS plus the inverse of WF1)

**½ Time** – Half the amount of fuel available, converted to time, to take off from the departure point, fly to some point, and return to the planned return airfield with the required overhead fuel remaining. In the no-wind situation ½ Time equals PSR Time.

**PSR** – Estimated Time En-route (ETE) to a point where a safe return is assured.

#### 4.3. Descent and Arrival.

4.3.1. Prior to descent, the AC will confirm site coordinates and theater approved RNAV routing is properly entered into SCNS and independently verified by another pilot or navigator (T-3).

4.3.2. Prior to descent, the crew will attempt to establish two-way communications with the site to obtain current weather conditions and traffic information (T-3). See [paragraph 5.1](#) **NOTE:** If weather reporting capability is not available, the PIC is the final authority on determining if conditions are suitable for safe descent and landing.

4.3.3. Crews will set the lowest forecast altimeter setting prior to descent through transition level when local altimeter setting is unavailable or unreliable (T-3).

4.3.4. Temperature extremes may require corrections to minimum altitudes. Cold weather temperature corrections will be applied in accordance with AFMAN 11-217V1, AFI 11-202V3 and the FIH (T-2).

4.3.5. Crews will avoid descent rates in excess of 1,000 FPM, airspeed in excess of 230 KIAS and bank angles in excess of 30 degrees when within 3,000 feet AGL and either in IMC or over barren featureless terrain (T-2).

4.3.5.1. Referencing the radar altimeter, the PM will state passing “3,000 feet” AGL (T-3).

4.3.5.2. Descending below 3,000 feet AGL, the aircrew should compare aircraft true altitude (ground elevation + radar altimeter) to indicated pressure altitude for indications of a gross error in local altimeter setting. If altimeter setting is in question, consider a Pressure Altimeter Update (Refer to [paragraph 4.4.7](#)).

4.3.6. Descent below the enroute Minimum IFR Altitude in IMC is prohibited (T-1) unless:

4.3.6.1. Descending via an IMC letdown procedure or,

4.3.6.2. Established on a published instrument approach,

4.3.7. IMC Letdown Procedures. Landing Zones (LZ's) without a published instrument approach may require a procedural IMC Letdown Corridor or use of a Restricted Operating Zone (ROZ). These procedures allow for a safe IMC descent from the enroute MIA to attain VMC. IMC letdown procedures and associated MIAs will be developed by 109 OSS/OSK IAW AFTTP 3-3.C-130H (T-3).

4.3.7.1. IMC Letdown Corridor. An IMC letdown corridor allows an aircraft to operate safely below the minimum IFR enroute altitude.

4.3.7.1.1. All corridors constructed for polar operations will provide a minimum of 1,000 feet (2,000 feet in mountainous terrain) obstacle clearance within 5 Nautical Miles (NMs) of planned course (T-3).

4.3.7.1.2. Corridors will include an Entry, Decision, Latest Climb, and Exit points (T-3).

4.3.7.2. Restricted Operating Zone (ROZ). A ROZ is typically a cylindrical area of protected airspace which allows an aircraft to “spiral down” to an altitude not lower than ROZ MSA. A ROZ will be placed for maximum utility and therefore, may not always be centered on a landing site or Objective Area (OA).

4.3.7.2.1. Polar ROZ's will provide a minimum of 1,000 feet (2,000 feet in mountainous terrain) obstacle clearance within 5 NMs of the defined boundaries of the ROZ (T-3).

4.3.7.3. Crews will utilize all available navigational aids (e.g. SCNS, Low Power Color Radar (LPCR) and Moving Map) to ensure adequate terrain and obstacle clearance (T-3). Crews will perform a thorough review of terrain and obstacles, weather and aircraft climb performance before commencing a descent below the enroute MIA (T-3).

4.3.7.4. If use of an IMC letdown procedure does not allow the aircraft to attain and maintain VMC, the aircraft should remain within ROZ/Letdown Corridor protected airspace to climb back to the enroute MIA (T-2).

4.3.7.5. An IMC Letdown Procedure can be used to position aircraft for an Airborne Radar Approach (ARA).

4.3.7.6. 109 OSS/OSK will develop site specific, forecast weather minimums for use with IMC Letdown Procedures. These minima will be considered prior to departure from the staging base.

#### 4.4. Approach.

4.4.1. If unable to contact ground personnel, all approaches (VFR and IFR) should be initiated over the landing threshold or open-snow coordinates. This allows the aircrew to verify coordinates, determine the altimeter setting, evaluate the weather conditions, alert site personnel and inspect the landing area prior to landing. All approaches shall be flown so as not to exceed stabilized approach criteria (T-2).

4.4.2. For approach weather minima see **paragraph 5.1**.

4.4.3. A SCNS LZ should be programmed and briefed for all landings. Program SCNS to give distance remaining to the LZ threshold, target open snow coordinates or as otherwise briefed.

4.4.4. The PIC is responsible for maintaining separation of aircraft in uncontrolled airspace. The PIC will maintain a minimum 1,000 feet of vertical separation between aircraft until safe lateral separation is assured (T-3).

4.4.4.1. Traffic advisory calls will be made over Common Traffic Advisory Frequency (CTAF) in uncontrolled airspace IAW AFMAN 11-217V1&2 and applicable theater annex (T-3).

4.4.5. Prior to crossing the intermediate fix (IF), monitor radar altimeters for indications below 1,000 feet AGL. If in IMC and altimeter accuracy is in question, crews will perform a Pressure Altimeter Update (PAU) and continue to monitor the radar altimeter to touchdown (T-3).

4.4.6. Stabilized Approach Criteria (SAC). During all ski approaches, the aircraft must be stabilized on final approach and will be in the landing configuration before descending below 300 feet AGL (T-3). An aircraft is considered stabilized on final approach when it is: (1) aligned with the extended centerline, (2) no more than 10 degrees of bank angle, (3) established on a normal glide path and (4) within 5 knots of approach speed. With the

exception of momentary deviations, a go-around or missed approach will be accomplished any time the approach becomes unstable below 300 feet AGL (T-3).

4.4.7. Pressure Altimeter Update (PAU). If the camp reported altimeter setting is not available, or accuracy is in question, perform a PAU before starting an ARA. The PAU procedure will allow the crew to determine a safe barometric altimeter setting. For additional information, reference AFTTP 3-3.C-130H, *Pressure Altimeter Update Using the Radar Altimeter* section.

4.4.7.1. PAU Procedure. The PAU is conducted over a checkpoint of known elevation, normally the threshold of a landing zone. Descend and pass over the PAU checkpoint, referencing the radar altimeter, at the Radar Altimeter Check Altitude (RACA) published on the ARA procedure. **NOTE:** Aircraft is normally at MSA for an altimeter update. Published RACA is the difference between aircraft MSL altitude (MSA or as annotated) and ground elevation at a known checkpoint:

4.4.7.2.  $RACA (AGL) = \text{aircraft crossing altitude (MSL)} - \text{checkpoint elevation}$

4.4.7.2.1. When over the PAU checkpoint, the pilot's barometric altimeter will be adjusted to the appropriate barometric altitude (normally MSA published on ARA plates) (T-3). The copilot and navigator will adjust their respective altimeter setting to match the pilot's (T-3).

4.4.7.2.2. Once an updated altimeter setting has been determined, the barometric altimeter will be referenced as the primary altitude reference for the remainder of the approach (T-3). The radar altimeter will continue to be crosschecked (T-3).

4.4.7.2.3. After performing a PAU, crews will apply temperature correction to procedure altitudes IAW AFMAN 11-217V1, AFI 11-202V3 and the Flight Information Handbook (FIH) (T-3).

4.4.7.3. PAU is not required when:

4.4.7.3.1. Weather conditions meet or exceed a ceiling of 1,500 feet and a visibility of 3 SMs (T-3).

4.4.7.3.2. C2 approves; such approval will be disseminated by NOTAM and /or Read File.

4.4.7.3.3. A minimum of 2 consecutive LC-130 missions to the site confirming accurately reported altimeter settings are required prior to removing the PAU requirement for ARAs in IMC (T-3). Sites not requiring a PAU for initial seasonal operations will be listed in AFI 11-2C-130V3 Addendum D and theater annex (T-3). If inaccurate altimeter setting reports are identified at any time, C2 will suspend non-PAU arrivals to the site and update NOTAMs and/or Read File as applicable.

4.4.8. Ski Airborne Radar Approaches (ARA). Ski ARAs are instrument approach procedures designed and developed by 109 OSS/OSK TERPs specialists and approved by MAJCOM TERPs review. MAJCOM TERPs reviewing agency determination is dependent on operational theater and the mission supported.

4.4.8.1. The navigator will direct the ARA using aircraft radar as the primary means to position the aircraft (T-3).

4.4.8.2. The navigator will direct aircraft heading and descent profile until the Pilot Monitoring (PM) acquires visual references to safely guide the PF to the landing zone (T-3). When there are sufficient ground references to take over the approach guidance, the PM will state “copilot (or pilot) has the approach” (T-3). The PM will then provide approach guidance to the PF and the navigator will provide drift and distance to the landing threshold while continuing to monitor the aircraft’s ground track (T-3). If the PM has not stated “copilot (or pilot) has the approach” by the MAP, the navigator will call “go around” and the PF will execute the published missed approach (T-3).

4.4.8.3. The PM will observe three sets of lead-in or skiway flags and the approach must meet Stabilized Approach Criteria (SAC) before stating “continue descent” (T-3). The PF may then descend no lower than 100 feet AGL (T-3). Before descending below 100 feet AGL, the PF will see the landing zone and state “pilot (or copilot) has the skiway (or ski landing area)” (T-3). Transfer of aircraft control to the landing pilot will be made stating “pilot (or copilot) has the aircraft” prior to descending below 100 feet AGL (T-3).

4.4.8.4. If the PF cannot acquire the landing zone or the aircraft is not in a safe position to land, the PF will execute a go around (T-2). On climb-out, the navigator will call passing 50, 100, 200, 300 and 400 feet AGL, or as briefed by the PF.

4.4.8.5. For weather minima see [paragraph 5.1](#)

#### 4.5. Landing Restrictions.

4.5.1. Navigator will call passing 300, 200, 100, 50, 25 and 10 feet AGL, or as briefed by the PF.

4.5.2. Wind Restrictions. Ski landings are prohibited when the surface wind (including gusts) exceeds 35 knots or the crosswind component exceeds 15 knots (T-2).

4.5.3. Ski landings will be conducted by a ski mission qualified aircraft commander in the left seat or a ski mission qualified instructor pilot in either seat (T-3). *EXCEPTION:* See [Chapter 5](#).

4.5.4. Night ski landings require 109 AW/CC approval.

4.5.5. Practice or actual minimum run ski landings require 109 OG/CC approval.

4.5.6. Anytime the aircraft is stopped after a ski landing, the flight engineer will visually inspect the skis. The PIC may waive this requirement.

4.5.7. For landing weather minima restrictions, reference [paragraph 5.1](#)

**4.6. Ski ARA Flyability Check and Airfield Marking (Skiway) Certification.** In-Theater evaluation of a Ski ARA consists of a flyability check of the ARA procedure (when required) and a marking certification to confirm skiway marking is IAW AFI 13-217.

4.6.1. Flyability Check. A flyability check will consist of a flight to verify that the approach provides suitable obstacle and terrain clearance, confirm procedure headings and alignment, review procedure complexity and evaluate flight deck workload (T-3).

4.6.1.1. 109 OSS/OSK will identify procedures requiring flight check as part of the planning process and will annotate this requirement on the *Pre- Season Site Analysis Checklist*. Flight check will be only accomplished for new ARA procedures where an

Instrument Approach has not previously existed or in cases where the procedure has been significantly modified (T-3).

4.6.1.2. Flyability Checks will be performed with weather at or above a ceiling of 1500 ft. and visibility of 3 miles (T-3). All segments of the procedure should be flown in VMC to the maximum extent possible.

4.6.1.3. Crews will evaluate the radar presentation and ensure that flagging, obstacles and terrain are clearly discernible (T-3). Annotate clutter, camp layout and abnormalities. Crews will document procedure compliance or discrepancies on *Skiway / SLA Marking Certification and ARA Flyability Check* (T-3).

4.6.2. Airfield Marking Certification. Airfield marking certification will ensure that each skiway complies with minimum flagging requirements IAW AFI 13-217 and that flags are visible from the air, both visually and on radar (T-3). Certification is independent for each skiway direction and will include a review of both lead-in flags and skiway flags for a given direction of flight (T-3).

4.6.2.1. All seasonal skiways require an airfield marking certification unless otherwise identified in theater annex (T-3).

4.6.2.2. Until skiway markings are certified, ARA weather minimums will be not less than 1000 feet and 3 miles (T-3).

4.6.2.3. Surface grooming conditions should be noted, but are not required for certification. Grooming status will affect maximum aircraft gross weight restrictions only. See [paragraph 3.2](#)

4.6.2.4. When authorized by C2, certification of airfield markings IAW AFI 13-217 may be performed by ground personnel.

4.6.2.5. Crews will document certification or discrepancies on *Skiway / SLA Marking Certification and ARA Flyability Check* (T-3).

**4.7. Emergency Landing Procedures.** It may become necessary to execute an emergency landing or land in a non-surveyed area. Use all available resources to locate the most suitable site. Reference Annex A, and theater annex for additional guidance.

4.7.1. When in the vicinity of an established site, confer with ground personnel to determine a safe landing location that presents the fewest known ground hazards.

**4.8. Airdrop Procedures (Polar Airdrop).** The nature and operational restrictions inherent in polar airdrop environments impose a number of significant challenges not encountered in traditional airdrop employment. The use of austere, flexible drop zones, potential lack of DZ personnel, minimum weather services and poor terrain/obstacle data are some of the challenges. Extensive pre-mission objective area planning, user coordination and potential collateral damage assessment is essential to mission success; reference AFTTP 3-3.C-130H, *Airdrop Methods and Techniques* section.

4.8.1. Airdrop in a polar environment should normally be executed in VMC. Non-Joint Precision Airdrop System (JPADS), IMC “coordinate only” airdrops require C2 approval and a theater specific waiver to AFI 11-2C-130V3 restrictions (T-2).

4.8.2. Ski ARA procedures combined with Mission Computer Airdrop techniques provide a stable platform and accurate means of positioning the aircraft. When no discernible ground features exist (e.g. camp, cache, vehicle or terrain feature) the box pattern may be omitted and the airdrop conducted over fixed coordinates. See [Figure 4.2](#)

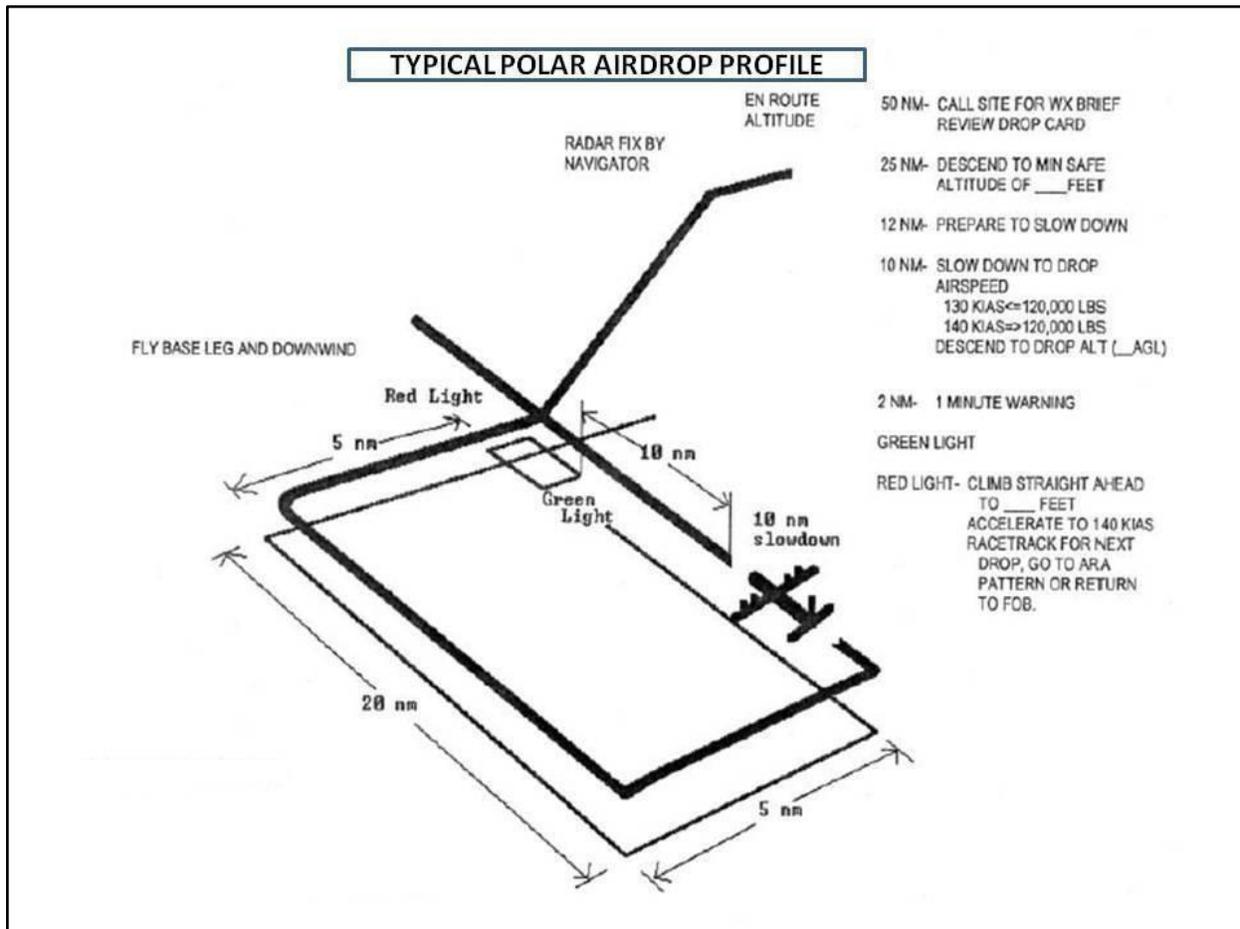
4.8.3. 109 OSS/OSK will provide aircrew with a mission folder for airdrop missions (T-3). If a mission folder is not available, a thorough mission plan will be formulated prior to departure and approved by appropriate C2 (T-3).

4.8.4. For airdrops where cabin pressure altitude is expected to exceed 10,000 feet MSL, Medium/High Altitude qualified aircrews, procedures and equipment will be used (T-2).

4.8.5. Minimum equipment for polar airdrop will include an operational APN-241 LPCR, SCNS and #1(pilot's) radar altimeter (T-3).

4.8.6. C2 will determine requirement for additional crewmembers (i.e. extra navigator, loadmaster).

**Figure 4.2. Typical Polar Airdrop Profile.**



## Chapter 5

### WEATHER

#### 5.1. Weather Minima.

5.1.1. General. In addition to AFI 11-202V3 and AFI 11-2C130V3 restrictions, reference applicable theater annex for theater specific weather requirements. 109 OSS/OSK will set higher weather minimums when required for safety (T-3). Changes to 109 OSS/OSK established weather minimums require C2 approval and will be published by NOTAM/Read File (T-3).

5.1.2. Departure. Do not depart a Polar Landing Zone when visibility is less than ½ SM (800M); the PIC may use airfield flagging as an aid in determining visibility (T-1). If departing a site with weather less than return approach minimums, a departure alternate is required. When departing an open snow site, crews will ensure ability to climb in VMC until reaching the applicable MIA (T-1).

5.1.2.1. VFR Departure. Maintain VMC and obtain an IFR clearance prior to entering controlled airspace (T-2).

5.1.2.2. IFR Departure. Obtain IFR clearance prior to takeoff. If unable, the PIC may depart under IFR in Class G airspace in IMC; however, an approved IFR departure method is still required (T-2). The PIC is responsible for maintaining traffic and terrain/obstruction clearance. Obtain an IFR clearance prior to entering controlled airspace (T-2).

5.1.3. Descent. If not established on a segment of an IFR approach, do not descend below the applicable MIA (Enroute, ROZ, or Letdown Corridor) unless able to remain in VMC until landing (T-2).

5.1.3.1. Due to visual limitations and illusions, descent below 1,000 feet AGL to a VMC only destination is not recommended unless the landing area is in sight. Surface/Horizon conditions should be considered prior to descent.

5.1.4. Approach & Landing.

5.1.4.1. MAJCOM approved ARA – As published, will not be less than 300 feet and 1 mile (T-1).

5.1.4.2. IFR Visual Approach/VFR arrival – will not be less than 1500 feet and 3 miles (T-1).

5.1.4.3. Open snow landings - VMC below the MIA and Surface/Horizon condition of Fair/Fair (T-1).

**5.2. Surface and Horizon Condition Definitions.** Surface and horizon condition values are determined and reported by an observer on the surface or determined by the aircrew when no observer is present (i.e. initial put-in). They are intended for pilot advisory information and are not limiting, except where listed in other parts of this chapter.

5.2.1. Surface Definition Values.

5.2.1.1. Good: Snow features such as sastrugi, drifts and gullies are easily identified by shadow. The sun is usually un-obscured.

5.2.1.2. Fair: Snow surface features can be identified by contrast, but no definite shadows exist. The sun is usually partially to near totally obscured.

5.2.1.3. Poor: Snow surface features cannot be readily identified except from close up. The sun is usually totally obscured.

5.2.1.4. Nil: Snow surface features cannot be identified. No shadows or contrast exist. Dark objects appear to float in the air. Although the overcast may exhibit considerable glare, the sun is totally obscured. Due to surface reflection, the glare appears to be equally bright in all directions.

#### 5.2.2. Horizon Definition Values.

5.2.2.1. Good: The horizon is sharply defined by sky and snow contrast.

5.2.2.2. Fair: The horizon may be identified although the contrast between sky and snow surface is not sharply defined.

5.2.2.3. Poor: The horizon is barely discernible.

5.2.2.4. Nil: Total loss of horizon definition. The snow and sky surfaces appear to merge.

## Chapter 6

### TRAINING RESTRICTIONS

#### 6.1. Training Restrictions.

- 6.1.1. Practice no-flap ski landings are prohibited **(T-3)**.
- 6.1.2. Touch and Go ski landings are prohibited. If performing multiple ski takeoff and landings, crews may stay on the Touch and Go checklists **(T-3)**.
- 6.1.3. The following pilots are authorized to perform ski takeoffs and landings:
  - 6.1.3.1. Ski ACs from the right seat, under direct Instructor Pilot (IP) supervision.
  - 6.1.3.2. Ski mission qualified copilot receiving Ski AC upgrade training in the left seat, under direct IP supervision.
  - 6.1.3.3. Ski mission qualified copilot in the right seat, under direct IP supervision and the following conditions:
    - 6.1.3.3.1. Weather: ceiling of 1,500 feet and visibility of 3 SMs (1500/3) or better **(T-3)**.
    - 6.1.3.3.2. Surface/Horizon definitions: Fair/Fair or better **(T-3)**.
    - 6.1.3.3.3. Maximum crosswind of 10 knots **(T-3)**.
    - 6.1.3.3.4. No passengers **(T-2)**.
    - 6.1.3.3.5. Skiway operations only; no open snow or SLA operations **(T-3)**.
- 6.1.4. Open Snow Training. A surveyed open snow training area exists at Raven Camp in Greenland and at the McMurdo White-Out Area in Antarctica. Open snow and simulated white-out landing training at these (or other locations) require C2 approval. Refer to applicable theater annex for theater specific guidance. The following conditions must be met:
  - 6.1.4.1. Weather: ceiling of 1,500 feet and visibility of 3 SMs (1500/3) or better **(T-3)**.
  - 6.1.4.2. Surface/Horizon definitions: Fair/Fair or better **(T-3)**.
  - 6.1.4.3. Aircraft is not needed for maintenance and/or follow on event **(T-3)**.
  - 6.1.4.4. No passengers, sensitive cargo, or any cargo requiring immediate handling **(T-3)**.
  - 6.1.4.5. Maximum aircraft gross weight of 118,000 lbs with fuel distribution IAW T.O. 1C-130(L)H-1 max-effort landing restrictions **(T-3)**.
  - 6.1.4.6. IP in either seat required for simulated White Out landing training; landings will be accomplished using outside visual references **(T-3)**.
- 6.1.5. Practice Minimum Run Ski Landings requirements:
  - 6.1.5.1. IP will be in either seat **(T-3)**.
  - 6.1.5.2. Maximum gross weight will be 125,000 lbs for ski airfields or 118,000 lbs for open snow **(T-3)**.

6.1.5.3. 109 OG/CC approval.

6.1.6. Simulated engine failure training will follow this guidance (T-3):

6.1.6.1. IP will be in either seat (T-3).

6.1.6.2. The higher of circling minimums or a ceiling of 1,500 feet and visibility of 3 SMs (1500/3) or better (T-3).

6.1.6.3. Surface/Horizon definitions: Fair/Fair or better (T-3).

6.1.6.4. No passengers (T-2).

6.1.6.5. Maximum gross weight of 125,000 lbs (T-3).

6.1.6.6. Ski airfield only (T-3).

6.1.6.7. Simulated engine failure will be on the upwind side for landing.

SCOTT A. VANDER HAMM, Maj Gen, USAF  
Assistant DCS, Operations

**Attachment 1****GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION*****References***

TO 1C-130(L)H-1, *Flight Manual*, 2 December 2009

TO 00-25-172, *Ground Servicing of Aircraft and Static Grounding*, 19 August 2013

AFI11-202V3, *General Flight Rules*, 07 November 2014

AFI 11-2C-130V3, *C-130 Operations Procedures*, 23 April 2012

AFI 13-217, *Drop Zone and Landing Zone Operations*, 10 May 2007

AFI 33-360, *Publications and Forms Management*, 1 December 2015

AFMAN 11-217V1, *Instrument Flight Procedures*, 22 October 2010

AFMAN 11-217V2, *Visual Flight Procedures*, 22 October 2010

AFMAN 11-217V3, *Supplemental Flight Information*, 23 February 2009

AFMAN 24-204(I), *Preparing Hazardous Materials for Military Air Shipments*, 3 December 2012

AFMAN 33-363, *Management of Records*, 1 March 2008

AFTTP 3-3.C-130H, *Combat Aircraft Fundamentals C-130H*, 26 March 2014

DODD 5101.16, *Executive Agent for Support to the National Science Foundation (NSF) Division of Polar Programs (PLR)*, 12 June 2015

Operation DEEP FREEZE OPORD

***Adopted Forms***

AF Form 847, *Recommendation for Change of Publication*

***Abbreviations and Acronyms***

**AC**—Aircraft Commander

**AGL**—Above Ground Level

**ARA**—Airborne Radar Approach

**ATO**—Assisted Takeoff

**AW/CC**—Airlift Wing Commander

**C2**—Command and Control

**CDS**—Container Delivery System

**ESA**—Emergency Safe Altitude

**FIH**—Flight Information Handbook

**FPM**—Feet Per Minute

**FDP**—Flight Duty Period  
**IF**—Intermediate Fix  
**IMC**—Instrument Meteorological Conditions  
**LPCR**—Low Power Color Radar  
**LZ**—Landing Zone  
**MEA**—Minimum Enroute Altitude  
**MHE**—Material Handling Equipment  
**MIA**—Minimum IFR Altitude  
**MSA**—Minimum Safe Altitude  
**MSL**—Mean Sea Level  
**OA**—Objective Area  
**OSF/OSK**—Operations Support Flight/Tactics  
**NOTAM**—Notice to Airmen  
**PAU**—Pressure Altimeter Update  
**PF**—Pilot Flying  
**PIC**—Pilot in Command  
**PLZ**—Polar Landing Zone  
**PM**—Pilot Monitoring  
**PSR**—Point of Safe Return  
**RACA**—Radar Altimeter Check Altitude  
**RM**—Risk Management  
**ROZ**—Restricted Operating Zone  
**RNAV**—Area Navigation  
**SAR**—Search and Rescue  
**SCNS**—Self Contained Navigation System  
**SOF**—Supervisor of Flying  
**VMC**—Visual Meteorological Conditions

*Terms*

**Flyability Check**—An in-flight safety evaluation of a new ski ARA procedure  
**Flagging**—Flags used to define a ski airfield or ice runway per AFI13-217  
**Grooming**—Preparation of a ski airfield to improve smoothness

**Ice Runway**—A wheeled landing zone constructed on floating ice, glacial ice, or compacted snow

**Lead-in Flags**—A line of flagging extending out approximately 2 nautical miles from skiway/ice runway threshold to aid in aligning the aircraft for landing

**Markings**—Flagging used to define ski airfields and ice runways; usually constructed of fabric and bamboo poles

**Open Snow**—A planned LC-130 open field landing zone that is unmarked and ungroomed

**Polar Landing Zone**—A planned LC-130 landing surface that includes skiways, ski landing areas, ice runways, or open-snow areas

**Ski Airfield**—Marked airfields for ski aircraft operations that include skiways and ski landing areas

**Skiway**—A ski airfield marked per AFI13-217 that allows for ARA approaches to reduced weather minimums

**Ski Landing Area**—A ski airfield marked per AFI13-217 that has reduced flagging from that of a skiway

**Surface and Horizon Definition**—Terms used to describe the ability to visually discern airfield surface and horizon defined in terms of Good, Fair, Poor, or Nil

**Table Top**—A ground based evaluation of TERPS information generally associated with enroute minimum safe altitudes and instrument approach procedures

**Whiteout Area**—A surveyed safe area that allows an instrument letdown and landing when planned recovery airfield is below safe landing weather minimums

## Attachment 2

POLAR MOBILITY B BAG CONTENTS<sup>1,2</sup>

ECW Expedition Bag or equivalent	1 ea.
ECW Parka with Hood and Trousers	1 ea.
Fleece Liner Top and Bottom	1 ea.
Wool socks (or equivalent)	4 pr.
ECW Boot or Over boot	1 pr.
Cold Weather Leather Boot	1 pr.
ECW Mitten	1 pr.
Cold Weather work glove	1 pr.
Medium Weight Thermal Underwear	2 ea. (Top and Bottom)
Heavy Weight Thermal Underwear	1 ea. (Top and Bottom)
Goggles with UV protection	1 ea.
UV Sunglasses	2 ea.
Watch Cap or equivalent	1 ea.
Balaclava	1 ea.
Water Bottle	1 ea.
Half or Full MSA Mask w/GME-P100 filter	1 ea. (Optional)
Arctic Carhartt/Black Jacket, Coveralls, and hood	1 ea. (Optional)
<b>NOTE 1.</b> Survival Bag items listed above when not being worn, will be carried in the Arctic Survival Gear bag along with other personal survival items ( <b>T-3</b> ).	
<b>NOTE 2.</b> Arctic Carhartt/Black Jacket, Coveralls, and Hood are not a suitable replacement for the EWC Parka, Hood, and Trousers in the mobility bag B.	